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(54) Spill resistant cup

(57) A child's cup comprises three parts; a container (1) and a lid comprising two parts, 3 (with a drinking spout 7) and 15. Within the lid a fluid passage is formed by a groove (12) in the base 9 of the first part 3 and another groove in the upper edge 17 of the second part 15. When combined these grooves, which are mirror images of each other, form a curved fluid passage extending through almost 360 degrees to prevent spilling. The spout 7 is connected to this fluid passage by passage 11 which is substantially orthogonal to and connected to the groove in the base 9. The two parts of the lid 15, 3 can be secured together by screw thread or snap fit.

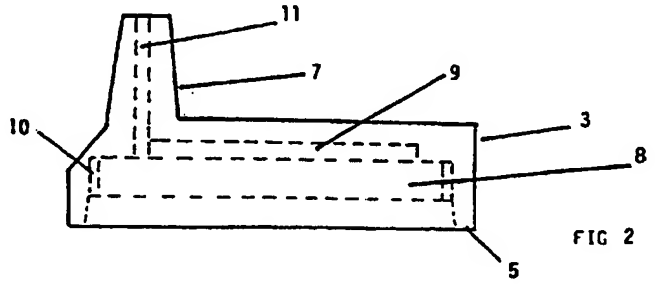

FIG 2

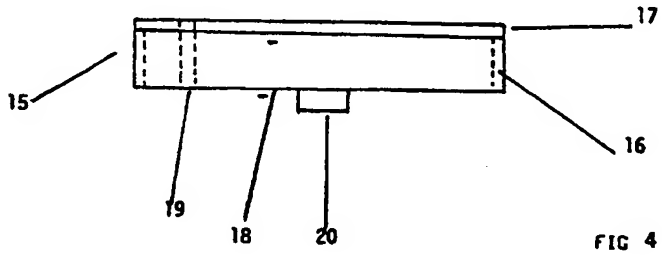

FIG 4

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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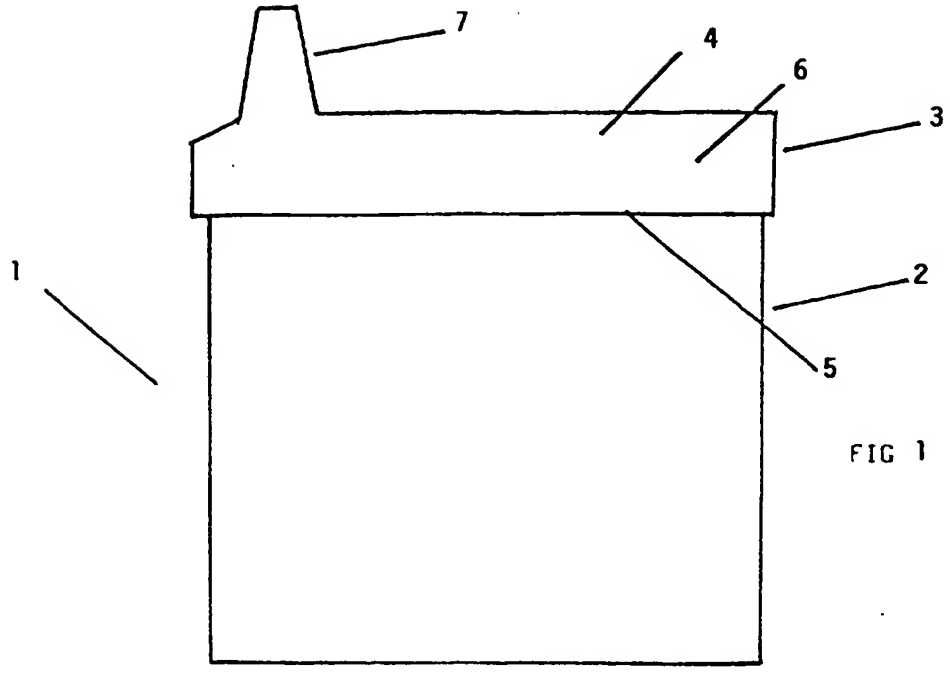

FIG 1

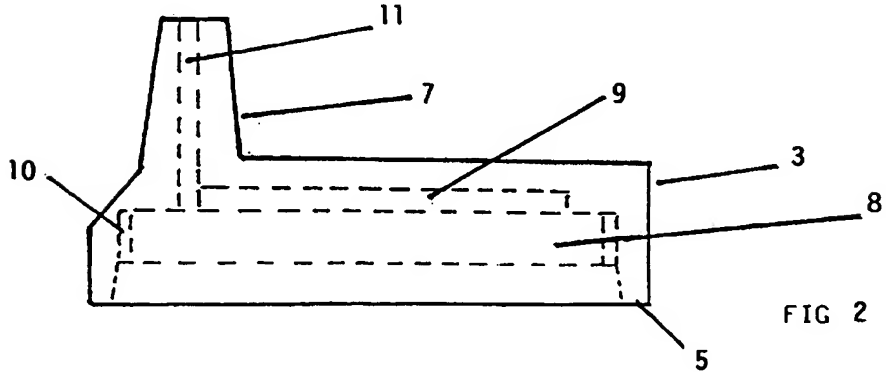

FIG 2

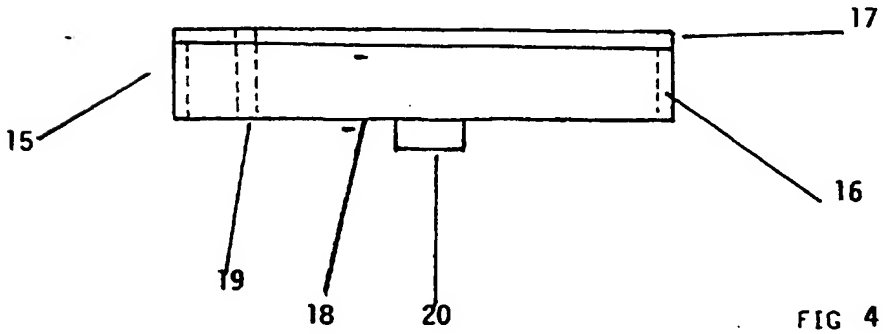

FIG 4

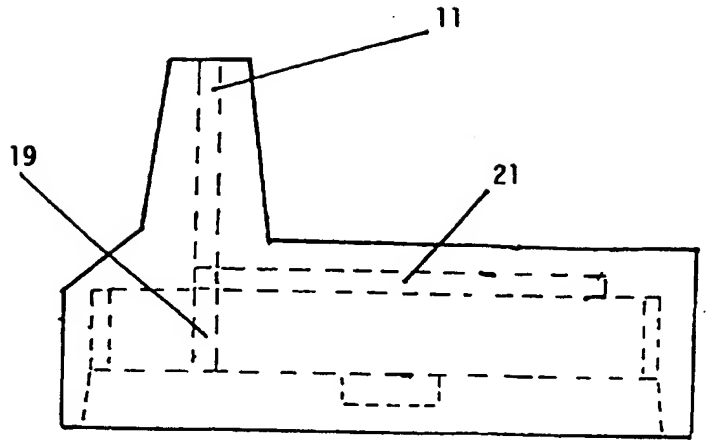

FIG 5

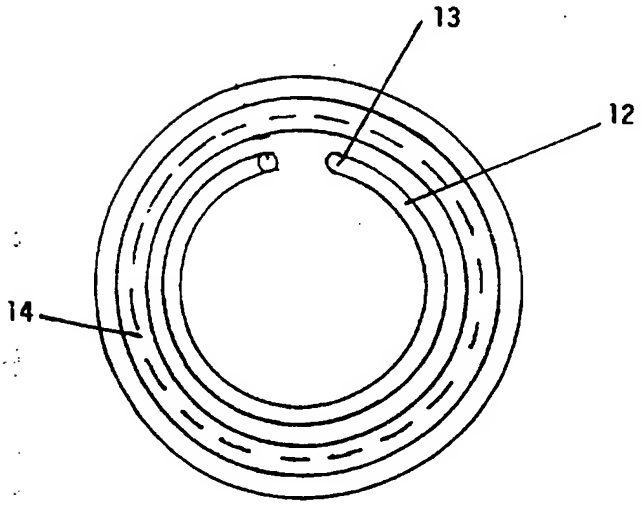

FIG 3

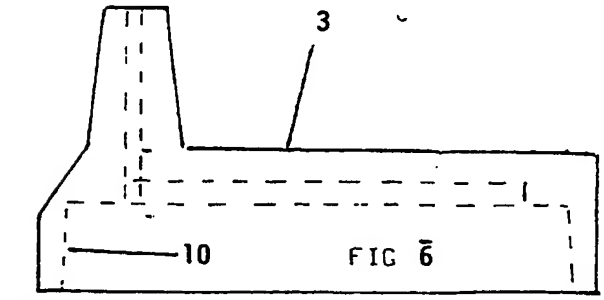

FIG 6

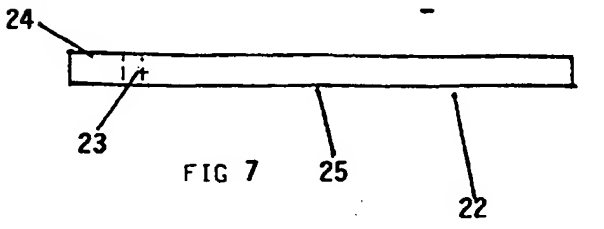

FIG 7

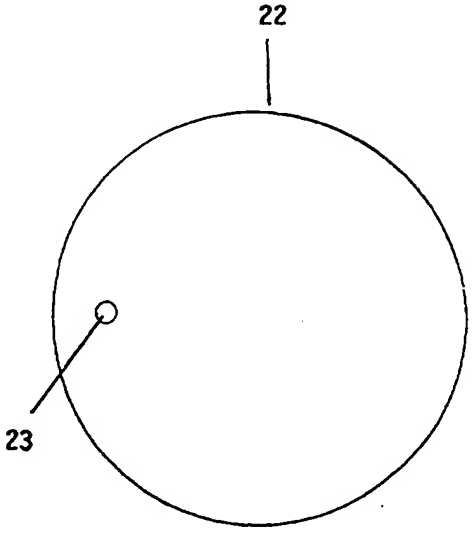

FIG 8

A BABY'S DRINKING CUP

This invention relates to a baby's drinking cup. More particularly, but not exclusively, the invention relates to a baby's drinking cup for reducing spillage when being shaken or inverted.

Drinking cups for use by babies or young children are well known. Such cups usually comprise a hollow container and a detachable lid. Typically, the joint between the lid and the container is airtight. The lid includes a spout or other protrusion extending from the lid and adapted to be received by a baby's mouth. The spout includes a number of small apertures through which fluid can be drawn from the container.

If fluid is drawn from the container the pressure inside the container drops. If the apertures are then exposed to the air, the air will rush back through the apertures into the container until the air pressure inside the container is equal to that on the outside.

If such a cup is tipped on its side a small amount of fluid will leak from the cup and consequently the air pressure inside will drop slightly. The external air pressure will then exert a restoring force on the remaining fluid in the cup preventing further spillage. In other known cups the cup will go through a number of cycles of the spilling of fluid followed by pressure equalisation before the cup reaches equilibrium.

Such cups prevent a child from spilling the entire contents in one motion. However, children quickly learn that by inverting, rotating or shaking the cup the contents can slowly be removed. If left for long enough the cup can be completely emptied by a child in this way.

This type of cup will also spill its contents if it is upturned or tilted during transit. Cups are known which

prevent spills during transit by opening and closing the spout. However, this is done by rotating the lid of the cup between an open and closed position, and once opened does not prevent the child spilling the fluid as previously described.

The present invention provides a baby's cup comprising a lid having an aperture and a container, said aperture and said container being in fluid communication by a fluid conduit, a first portion of said conduit being orthogonal to a second portion of said conduit.

Accordingly in a first aspect there is provided a babies drinking cup for reducing spillage of the cup's contents when being moved, comprising

a hollow container;

a container lid adapted to provide air tight engagement with said container;

a fluid conduit;

said container lid including a spout adjusted to be received in a baby's mouth, the spout including an aperture

said aperture and said container being in fluid communication via said fluid conduit when said lid and said container are engaged

said conduit defining an elongate passageway having a first portion and a second portion,

said first portion being substantially orthogonal to said second portion for impeding the flow of fluid from said container to said aperture.

Such a baby's cup according to the invention has the advantage that only a small amount (if any) of fluid will be expelled on shaking or rotating.

The baby's cup of the invention can also be transported whilst containing a fluid and without the contents being spilt.

Preferably, the fluid conduit comprises a plurality of

mutually substantially orthogonal portions. This ensures that a portion of the fluid conduit will be orthogonal to the direction of force applied to the fluid by shaking or rotation of the cup so providing a flow impedance to the exit of fluid from the cup.

Preferably the fluid conduit curves through a plurality of directions so as to provide a flow impedance sufficient to reduce the escape of fluid from said container on shaking or rotating said cup.

The fluid conduit may comprise a first portion being a planar curve and a second portion extending parallel to the normal to the plane of the curve

A portion of the fluid conduit may be molded into the lid. This simplifies construction of the baby's cup.

The baby's cup may further comprise a closure cap for engagement with said lid, said closure cap and said lid being adapted to provide at least a portion of said fluid conduit. The advantage of such a closure cap is that the lid and the closure cap can be simple shapes which are relatively simple to manufacture by injection molding. The lid and closure cap can then be engaged to form a composite body having a complex fluid conduit. Such a composite body cannot be simply manufactured by injection molding.

Said closure cap and said lid may be adapted to threadingly engage.

Said closure cap and said lid may be adapted to engage by snap fitting or ultrasonic molding.

The diameter of the fluid conduit may be less than 5 mm.

The diameter of the fluid conduit may be less than 3 mm.

The present invention will now be described by way of example only with reference to the accompanying drawings in which

Figure 1 is a side view of the baby's cup of the invention;

Figure 2 is a cross-sectional view of a lid of the baby's cup according to a first embodiment of the invention;

Figure 3 is a plan view of the base of the lid of a first embodiment of the invention;

Figure 4 is a cross-sectional view of a closure cap of the baby's cup according to a first embodiment of the invention;

Figure 5 is a cross-sectional view of the lid of the first embodiment of the invention showing the closure cap in position;

Figure 6 is a cross-sectional view of a lid of a baby's cup according to a second embodiment of the invention;

Figure 7 is a cross-sectional view of a closure plate according to a second embodiment of the invention;

Figure 8 is a plan view of a closure plate according to a second embodiment of the invention.

Referring to Figure 1, the baby's cup 1 comprises a hollow container 2 and container lid 3. The lid 3 is generally cylindrical having an upper surface 4, a lower surfaces 5 and a body 6. Extending from the upper surface 4 of the lid is a spout 7 adapted to be received in a baby's mouth and having a plurality of apertures in its tip 8.

As shown in Figure 2 a cylindrical fluid cavity 8 extends from the lower surface 5 of the lid 3 into the lid body 6. The fluid cavity 8 comprises a base 9 substantially parallel to the lower surface 5 and a cylindrical side wall 10 extending from the base 9 to the lower surface 5. A first portion of the cylindrical wall 10 of the fluid cavity 8 is threaded for inter-engagement with a corresponding threaded portion surrounding the container mouth. When tightened, the threaded joint between the lid 3 and container 2 is airtight. The lid 3 is detachable.

A lid conduit 11 extends from the apertures in the spout 7 to the base 9 of the fluid cavity 8. The lid conduit 11 is a molded portion of the lid 3.

In an alternative embodiment the lid conduit 11 may be a separate component installed before use which can be removed for cleaning.

As shown in Figure 3, a groove 12 is molded into the base 9 fluid cavity 8. The groove 12 extends from the intersection of the lid conduit 11 with the base 9 in an arc to a terminal point 13.

A gasket 14 surrounding the groove 12 is also included in the base of the fluid cavity 8.

A second portion of the cylindrical side wall of the fluid cavity 8 is threaded for engagement with a closure cap 15. The diameter of the second portion is slightly less than that of the first portion.

The closure cap 15 shown in Figure 4 is generally cylindrical, the cylindrical wall 16 having an outer threaded surface for engagement with the second threaded portion of the fluid cavity 8.

The closure cap 15 has an upper face 17 and a lower face 18. A cap conduit 19 extends from the upper face 17 to the lower face 18. A handle 10 extends from the lower face 18 and is used to thread the closure cap 15 into the fluid cavity 8.

A second groove is molded into the upper surface 17 of the closure cap 15. The groove extends from the cap conduit 19 in a curve to a second terminal point. The closure cap groove is a mirror image of the groove in the base of the fluid cavity 8.

In use the closure cap 15 is threadably engaged with the lid 3. When fully tightened the groove in the closure cap 14 and the groove in the fluid cavity base 9 together form a base conduit 21 extending indirectly from the lid conduit 11 to cap conduit 19. The lid conduit 11 and the cap conduit 19 are parallel but non-coaxial. The base conduit 21 lies within a plane substantially normal to the axis of the lid and cap conduit (as shown in Figure 5).

When the closure cap 15 is fully tightened the gasket 14 abuts against the closure cap 15 so ensuring that the only fluid path between the upper and lower faces of the lid 3 is via the fluid conduits 11, 19, 21.

The closure cap may be tightened by the manufacturer before supply to the customer or by the customer on receipt of the cup. It will then only be removed for cleaning purposes.

The container 2 is then filled and the threaded portion of the lid 3 inter-engaged with the corresponding threaded portion of the container 2. The lid 3 is tightened until the joint between the lid 3 and container 2 is airtight.

When a child or baby sucks the spout 7 of the lid 3 the fluid in the container 2 is drawn through cap conduit 19, around the base conduit 21, through the lid conduit 11 and

finally to the aperture. The fluid is forced to flow through three substantially orthogonal directions to reach the aperture.

As the fluid is drawn along the fluid conduits 11, 19, 21 the volume of fluid in the container 2 is reduced causing a reduction air pressure in the container 2. When the child removes his mouth from the spout 7 the external air pressure pushes the fluid back along the fluid conduits 11, 19, 21 into the container 2. It is only when the fluid has been expelled from the fluid conduits 11, 19, 21 that the external air can enter the container 2 equalising the internal and external gas pressures.

If the cup 1 is shaken or rotated the fluid will be forced along the conduits 11, 19, 21. However, as the fluid travels along the conduits 11, 19, 21 it will reach a conduit portion substantially orthogonal to fluid direction of flow. This portion provides a large flow impedance reducing the velocity of the fluid along the conduit. This flow impedance, combined with the restoring effect of the external air pressure, prevents the fluid from escaping from the cup 1.

The fluid conduits 11, 19, 21 are shaped such that there is always a fluid conduit portion orthogonal to the direction of flow of the fluid irrespective of the direction of flow of the fluid, preventing escape of the fluid from the container 2.

Shown in Figure 6 is a lid 3 for a drinking vessel according to a second aspect of the invention. The side wall 10 of the fluid cavity 8 is smooth rather than threaded.

Shown in Figures 7 and 8 is a closure plate 22 for use with the lid of the second embodiment of the invention. The closure plate is an interference fit with the cylindrical wall 10 of the fluid cavity 8. An adhesive may be added to maintain

the closure plate 22 in position if required. This closure plate 22 has a conduit 23 extending from its upper surface 21 through the plate to the lower surface 25. The upper surface of the closure plate is blank.

When inserting the closure plate 22 into the lid 2, the plate 25 is oriented such that the conduit 23 is in contact with the terminal point of the groove in the base 9 of the fluid cavity 8. When in position, the groove in the base 9 and the blank upper face of the closure plate 22 together form the base conduit.

In a third embodiment of the invention the base 9 of the fluid cavity 8 is a blank plate and there is a groove formed in the closure plate 22. When inserted the groove in the closure plate 22 and the blank base of the fluid cavity 8 together form the base conduit.

In a further embodiment, the base conduit is a spiral.

In a further embodiment, the spout has only one aperture.

CLAIMS

1. A baby's drinking cup for reducing spillage when being moved, comprising

a hollow container;

a container lid adapted to provide air tight engagement with said container; and

a fluid conduit;

said container lid including a spout adapted to be received in a baby's mouth, the spout including an aperture;

said aperture and said container being in fluid communication via said fluid conduit when said lid and said container are engaged

said fluid conduit defining an elongate passageway having a first portion and a second portion,

said first portion being substantially orthogonal to said second portion for impeding the flow of fluid from said container to said aperture.

2. A cup as claimed in claim 1, wherein said fluid conduit comprises a plurality of mutually substantially orthogonal portions.

3. A cup as claimed in claim 1, wherein said fluid conduit curves through a plurality of directions so as to provide a flow impedance sufficient to reduce the escape of fluid from said container on shaking or rotating said cup.

4. A cup as claimed in claim 1, wherein said fluid conduit comprises a first portion being a planar curve and a second portion extending parallel to the normal to the plane of the curve.

5. A cup as claimed in claim 1, wherein said at least a portion of fluid conduit is molded into said lid.

6. A cup as claimed in claim 1, further comprising a closure cap for engagement with said lid, said closure cap and said lid being for comprising.the walls of at least a portion of said fluid conduit when engaged.

7. A cup as claimed in claim 6, wherein said closure cap and said lid are adapted to threadingly engage.

8. A cup as claimed in claim 6, wherein said closure cap and said lid are adapted to engage by snap fitting.

9. A cup as claimed in claim 1, wherein the diameter of said fluid conduit is less than 5 mm.

10. A cup as claimed in claim 1, wherein the diameter of said fluid conduit is less than 3 mm.